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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/068,343	02/05/2002	George P. Vella-Coleiro	1052.001	7673
22186	7590	02/07/2006	EXAMINER KUMAR, PANKAJ	
MENDELSON AND ASSOCIATES, P.C. 1500 JOHN F. KENNEDY BLVD., SUITE 405 PHILADELPHIA, PA 19102			ART UNIT 2631	PAPER NUMBER

DATE MAILED: 02/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/068,343

Applicant(s)

VELLA-COLEIRO, GEORGE P.

Examiner

Pankaj Kumar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 November 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,7-10,15,16 and 21-27 is/are rejected.
- 7) ☒ Claim(s) 3-6,11-14 and 17-20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/16/05</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

### ***Response to Amendment***

#### ***Claim Objections***

2. Claim 27 is objected to because of the following informalities: "(4)" should probably be '(d)' to be consistent. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2, 8, 15, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andrews 4,890,300 in view of Blauvelt USPN 6,288,814 and Moriyama USPN 6,091,941. Here is how the references teach the claims:

5. As per claim 1: A method for reducing spurious emissions in an amplified signal, comprising the steps of: (a) receiving an input signal (Andrews fig. 1: 2, 4); and (b) applying frequency-dependent (Andrews fig. 1: 8, 10, 12) phase pre-distortion (Andrews fig. 4: 40; if this is not sufficient then Blauvelt teaches retarding phase of the predistortion based on frequency in

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col. 11 lines 8-10; it would be obvious to combine as explained below) to the input signal to generate a pre-distorted output signal (Andrews fig. 1: output of 8, 10, 12; fig. 4: output of 40), wherein the frequency dependent phase pre-distortion is based on at least one corresponding phase difference between at least one pair of critical frequencies (not in Andrews but would be obvious as explained below), such that, when the pre-distorted output signal is applied to an amplifier to generate the amplified signal (Andrews fig. 1: 20), the frequency-dependent phase pre-distortion reduces spurious emissions in the amplified signal (Andrews fig. 1: by 16 choosing either 8, 10, or 12, the other two that are not chosen are spurious emissions which are reduced by not being chosen).

6. Andrews teaches frequency dependent (Andrews fig. 1: 8, 10, 12) phase pre-distortion (Andrews fig. 4: 40). However, if this is not sufficient, then Andrews does not teach frequency dependent phase pre-distortion. Blauvelt teaches frequency dependent phase pre-distortion with retarding phase of the predistortion based on frequency in col. 11 lines 8-10. Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at frequency dependent phase pre-distortion as recited by the instant claims, because the combined teaching of Andrews with Blauvelt suggest frequency dependent phase pre-distortion as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Andrews with Blauvelt because Andrews suggests frequencies and phase pre-distortion (something broad) in general and Blauvelt suggests the beneficial use of frequency dependent phase pre-distortion such as to compensate for the delay corresponding to a greater fraction of a cycle at higher frequencies in the analogous art of pre-distortion.

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7. Andrews does not teach wherein the frequency dependent phase pre-distortion is based on at least one corresponding phase difference between at least one pair of critical frequencies. Moriyama USPN 6,091,941 teaches wherein the frequency dependent phase pre-distortion is based on at least one corresponding phase difference between at least one pair of critical frequencies (Moriyama abstract: pre-distortion; col. 26 lines 52-53; col. 27 lines 36-37: rotated in terms of phase by the difference frequency between two reference carrier frequencies; the frequencies Moriyama works with are inherently critical since it would be inefficient for Moriyama to work on non-critical frequencies; col. 4 lines 25-27: phase difference). Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at the frequency dependent phase pre-distortion is based on at least one corresponding phase difference between at least one pair of critical frequencies as recited by the instant claims, because the combined teaching of Andrews with Moriyama suggest frequency dependent phase pre-distortion is based on at least one corresponding phase difference between at least one pair of critical frequencies as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Andrews with Moriyama because Andrews suggests frequencies and pre-distortion (something broad) in general and Moriyama suggests the beneficial use of predistortion through the phase difference between a pair of critical frequencies such as to obtain an offset to calculate the amount of phase distortion to apply in the analogous art of communications.

8. As per claim 2: The invention of claim 1, wherein step (b) comprises the steps of: (1) generating a main output signal from the input signal (Andrews fig. 1: main is out of 20 from

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input of 2, 4); (2) generating one or more frequency-dependent phase pre-distortion signals from the input signal (Andrews fig. 1: 8, 10, 12; fig. 4: 40); and Andrews does not teach (3) advancing or delaying each frequency-dependent phase pre-distortion signal relative to the main output signal; and (4) combining each advanced or delayed frequency-dependent phase pre-distortion signal with the main output signal to generate the pre-distorted output signal. Blauvelt teaches (3) advancing or delaying each frequency-dependent phase pre-distortion signal relative to the main output signal (Blauvelt teaches this in fig. 8: delay.); and (4) combining each advanced or delayed frequency-dependent phase pre-distortion signal with the main output signal to generate the pre-distorted output signal (Blauvelt fig. 8: combining after the delay).

9. As per claim 8: The invention of claim 1, wherein the input signal is an RF signal and the frequency dependent phase pre-distortion is applied in the RF domain (Andrews fig. 1: 4 RF).

10. Claim 15 is discussed above with respect to claim 1.

11. Claim 16 is discussed above with respect to claim 2.

12. Claims 7, 9, 10, 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andrews 4,890,300 in view of Blauvelt USPN 6,288,814 and Moriyama as applied to claim 1 above, and further in view of Kim USPN 6,903,604. Here is how the references teach the claims:

13. As per claim 7: The invention of claim 1, wherein the input signal is a baseband signal and the frequency-dependent phase pre-distortion is applied in the baseband domain (not in Andrews but would be obvious as explained below). Andrews does not teach that the input signal is a baseband signal and the frequency-dependent phase pre-distortion is applied in the

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baseband domain. Kim 6903604 teaches that the input signal is a baseband signal and the frequency-dependent phase pre-distortion is applied in the baseband domain (Kim fig. 1 with predistortion 20 in baseband.). Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at the input signal is a baseband signal and the frequency-dependent phase pre-distortion is applied in the baseband domain as recited by the instant claims, because the combined teaching of Andrews with Kim suggest input signal is a baseband signal and the frequency-dependent phase pre-distortion is applied in the baseband domain as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Andrews with Kim because Andrews suggests low range (Andrews fig. 1: 8) (something broad) in general and Kim suggests the beneficial use of low-range being low enough to be at baseband such as to estimate amplitude characteristics and update calculation of pre-distortion (Kim fig. 1: 25, 15) in the analogous art of pre-distortion.

14. As per claim 9: The invention of claim 1, wherein the frequency dependent phase pre-distortion is based on data retrieved from one or more look-up tables (not in Andrews but would be obvious as explained below). Andrews does not teach wherein the frequency dependent phase pre-distortion is based on data retrieved from one or more look-up tables. Kim teaches wherein the frequency dependent phase pre-distortion is based on data retrieved from one or more look-up tables (Kim col. 2 lines 17-20). Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at the frequency dependent phase pre-distortion is based on data retrieved from one or more look-up tables as recited by the instant claims, because the combined teaching of Andrews with Kim suggest the frequency dependent phase pre-distortion is based on data retrieved from one or more look-up tables as

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recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Andrews with Kim because Andrews suggests predistortion (something broad) in general and Kim suggests the beneficial use of predistortion using a table such as the practice being typical in the analogous art of predistortion.

15. As per claim 10: The invention of claim 9, wherein the one or more look-up tables are adaptively updated according to control signals generated based on the amplified signal (not in Andrews but would be obvious as explained below). Andrews does not teach wherein the one or more look-up tables are adaptively updated according to control signals generated based on the amplified signal. Kim teaches wherein the one or more look-up tables are adaptively updated according to control signals generated based on the amplified signal (Kim col. 2 lines 17-31). Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at the one or more look-up tables are adaptively updated according to control signals generated based on the amplified signal as recited by the instant claims, because the combined teaching of Andrews with Kim suggest one or more look-up tables are adaptively updated according to control signals generated based on the amplified signal as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Andrews with Kim because Andrews suggests pre-distortion (something broad) in general and Kim suggests the beneficial use of adaptively updating pre-distortion tables such as the practice being typical in the analogous art of predistortion.

16. Claim 21 is discussed above with respect to claim 7.



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17. As per claim 22: The invention of claim 15, wherein the input signal is an RF signal and the apparatus applies the frequency-dependent phase pre-distortion in the RF domain (Andrews fig. 1: 4 RF).

18. Claim 23 is discussed above with respect to claim 9.

19. Claim 24 is discussed above with respect to claim 10.

20. As per claim 25, it is discussed above with respect to claim 10. Also, the limitations in the preamble which are not the same as the ones in the body are not afforded patentable weight since these recitations occur in the preamble and recite the intended use of a structure and the body of the claim does not depend on the preamble for completeness and the bodily limitations are able to stand alone.

21. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Andrews 4,890,300 in view of Blauvelt USPN 6,288,814. Here is how the references teach the claim:

22. As per claim 26: A method for reducing spurious emissions in an amplified signal, comprising the steps of: (a) receiving an input signal (Andrews fig. 1: 2, 4); (b) applying frequency-dependent (Andrews fig. 1: 8, 10, 12) phase pre-distortion (Andrews fig. 4: 40; if this is not sufficient then Blauvelt teaches retarding phase of the predistortion based on frequency in col. 11 lines 8-10; it would be obvious to combine because as explained below) to the input signal to generate a pre-distorted output signal (Andrews fig. 1: output of 8, 10, 12; fig. 4: output of 40), such that, when the pre-distorted output signal is applied to an amplifier to generate the amplified signal (Andrews fig. 1: 20), the frequency-dependent phase pre-distortion reduces spurious emissions in the amplified signal (Andrews fig. 1: by 16 choosing either 8, 10, or 12,

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the other two that are not chosen are spurious emissions which are reduced by not being chosen) wherein step (b) comprises the steps of: (1) generating a main output signal from the input signal (Andrews fig. 1: main is out of 20 from input of 2, 4); (2) generating one or more frequency-dependent phase pre-distortion signals from the input signal (Andrews fig. 1: 8, 10, 12; fig. 4: 40).

23. Andrews teaches frequency dependent (Andrews fig. 1: 8, 10, 12) phase pre-distortion (Andrews fig. 4: 40). However, if this is not sufficient, then Blauvelt teaches retarding phase of the predistortion based on frequency in col. 11 lines 8-10. Andrews does not teach (3) advancing or delaying each frequency-dependent phase pre-distortion signal relative to the main output signal; and (4) combining each advanced or delayed frequency-dependent phase pre-distortion signal with the main output signal to generate the pre-distorted output signal. Blauvelt teaches (3) advancing or delaying each frequency-dependent phase pre-distortion signal relative to the main output signal (Blauvelt teaches this in fig. 8: delay.); and (4) combining each advanced or delayed frequency-dependent phase pre-distortion signal with the main output signal to generate the pre-distorted output signal (Blauvelt fig. 8: combining after the delay). Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at frequency dependent phase pre-distortion as recited by the instant claims, because the combined teaching of Andrews with Blauvelt suggest frequency dependent phase pre-distortion as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Andrews with Blauvelt because Andrews suggests frequencies and phase pre-distortion (something broad) in general and Blauvelt suggests the beneficial use of

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frequency dependent phase pre-distortion such as to compensate for the delay corresponding to a greater fraction of a cycle at higher frequencies in the analogous art of pre-distortion.

24. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blauvelt USPN 6,288,814 in view of Danielsons USPN 6,400,415. Here is how the references teach the claim:

25. As per claim 27: (a) a main signal processing path configured (Blauvelt paths of various figures such as figs. 1, 8, etc.) to apply frequency-independent magnitude and phase pre-distortion (not in Blauvelt but would be obvious as explained below) to the input signal to generate a main output signal (Blauvelt fig. 1: outputs in various figures such as figs. 1, 2, 4, 5, 8, 9, 10, etc.); (b) one or more frequency-dependent phase pre-distortion paths generate one or more frequency-dependent phase pre-distortion signals from the input signal (Blauvelt col. 2 lines 28-29); and (3) advancing or delaying each frequency-dependent phase pre-distortion signal relative to the main output signal (Blauvelt teaches this in fig. 8: delay); and (4) combining each advanced or delayed frequency-dependent phase pre-distortion signal with the main output signal to generate the pre-distorted output signal (Blauvelt fig. 8: combining after the delay).

26. Blauvelt does not teach to apply frequency-independent magnitude and phase pre-distortion. Danielsons teaches to apply frequency-independent magnitude and phase pre-distortion (Danielsons claim 1). Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at the apply frequency-independent magnitude and phase pre-distortion as recited by the instant claims, because the combined teaching of Blauvelt with Danielsons suggest apply frequency-independent magnitude and phase pre-distortion as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been

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motivated to combine the teachings of Blauvelt with Danielsons because Blauvelt suggests predistortion (something broad) in general and Danielsons suggests the beneficial use of frequency independent predistortion to remove dependency on frequency and instead be dependent on data conditions in order to have better error handling (Danielsons col. 2 lines 22-30) in the analogous art of predistortion.

*Allowable Subject Matter*

27. Claims 3-6, 11-14, 17-20 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

*Conclusion*

28. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

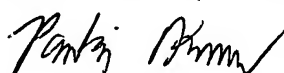
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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pankaj Kumar whose telephone number is (571) 272-3011. The examiner can normally be reached on Mon, Tues, Thurs and Fri after 8AM to after 6:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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PK